

REMARKS

This Amendment, submitted in response to the Office Action dated December 2, 2002, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 5-6, 9-11 and 18-34 remain pending in the application, with claims 18-22 and 26-30 being withdrawn from further consideration at this time pursuant to the Response to Restriction Requirement of September 9, 2002. Applicant have cancelled non-elected claims 18-22 and 26-30 from the application.

Claims 5, 6, 9, 10, 23, 24, 31 and 34 have been rejected under 35 U.S.C. § 103 as being unpatentable over Wenyon (U.S.P. 5,659,408). Claims 11 and 25 have been rejected under 35 U.S.C. § 103 as being unpatentable over Wenyon in view of McCoy (U.S.P. 4,285,029). Claim 32 has been rejected under 35 U.S.C. § 103 as being unpatentable over Wenyon in view of Ueda (U.S.P. 5,83,598). Claim 33 has been rejected under 35 U.S.C. § 103 as being unpatentable over Wenyon in view of Ueda and further in view of Weber (U.S.P. 3,647,289). Claims 5-6, 9-11, 23-25 and 31-34 have been rejected under the judicially created doctrine of obviousness-type double patenting in view of U.S.P. 6,384,883. Applicant submits the following arguments in traversal of the prior art rejections.

With regard to the prior art rejections of claims 32 and 33 over Ueda, Ueda has an effective filing date of July 18, 1996, which is after the Applicant's foreign priority dates of November 30, 1995, December 12, 1995 and January 22, 1996 based on JP (1995) 312361, JP (1995) 312362, JP (1995) 322973, JP (1996) 008531 and JP (1996) 008532. The English language translations of JP (1995) 312361, JP (1995) 312362, JP (1995) 322973, and JP (1996)

008532 were submitted in grandparent application 08/758,093 on May 20, 1999. Therefore, the rejections of claims 32-33 over Ueda should be withdrawn. Additionally, if the Examiner cites any additional reference against claims 32-33, such rejection must be made on a non-final basis.

The present invention is directed to a liquid crystal display element using a hologram. The liquid crystal display element is provided on the back surface side of the hologram and opposite to the display surface side, with a diffuse reflection type hologram. The diffuse reflection type hologram is capable itself of diffusing and reflecting light of selected wavelengths incident from a specific direction to defined viewing regions, wherein the hologram has a different optical function with respect to different wavelengths. The hologram enables light scattered through the scatter plate to be limitedly scattered within a visual field range.

The Examiner maintains that Wenyon teaches or suggests each feature of claim 5. Applicant would argue that the present invention describes a reflection volume type hologram. In Wenyon, in view of the orientation of the hologram, comprises a transmission hologram. Therefore, Wenyon clearly does not teach this aspect of claim 5.

Moreover, in the Office Action, the Examiner states that Wenyon discloses a reflective holographic optical element mounted on a reflective carrier or layer at column 6, line 4. Additionally, the Examiner states that a hologram is always wavelength selective and has a different optical function with respect to the different wavelengths, which would render claim 5 obvious.

However, although Wenyon disclose a reflective holographic optical element, it fails to disclose a diffuse reflecting hologram capable of diffusing reflecting wavelengths of light at

selected wavelengths, as in the present invention. In fact, Wenyon discloses a hologram to that provides achromatic bandwidths and suggests that color separation holograms are inappropriate for the teachings or the reference. (Col. 2, lines 52-56). To this end, Wenyon actually teaches away from what the Examiner suggests. Additionally, due to the achromatic nature of the Wenyon hologram, the selective nature of the hologram is not inherently included in the teachings of Wenyon. In fact, Wenyon notes that while color filtering aspects would be important for some applications, in the diffusion hologram of Wenyon, such color filtering is not desirable. Rather, Wenyon seeks to achieve a paper white effect, suggesting no wavelength differentiation in the Wenyon hologram. Therefore, the examples of λ_0 and λ_1 set forth by the Examiner are of no consequence, since in Wenyon, the desired effect is to avoid color filtering.

Thus, there is a significant difference between the presently claimed invention and Wenyon. The present invention makes use of a hologram having high wavelength selectivity (claim 34) whereas the latter make use of a hologram having low wavelength selectivity.

Therefore, based on the above claim 5 should be found allowable. Additionally, dependent claims 6, 9-11, and 23-25 and 31-34 should also be allowable at least for the same reasons above because they depend from independent claim 5 and possess the same novel and nonobvious features.

Moreover, McCoy does not overcome the deficiencies in Wenyon to render the claims 11 and 25 obvious.

Claims 11 and 25 are directed to a liquid crystal display device using a hologram wherein a self-luminous type back light unit is used on the backside of the diffused deflection type hologram.

The express teachings of Wenyon teach away from its combination with McCoy. In particular, Wenyon describes a display that is viewable in ambient light without additional backlighting, which introduces bulkiness to the display. (Col., lines 5-15; Col. 2, lines 29-31). Therefore, adding a backlight to Wenyon contradicts a principle object of the reference. In view of the contradictory teaching of Wenyon, Applicant would submit that the Examiner's rationale to include a backlight in Wenyon is based on improper hindsight reconstruction.

As an additional indication of hindsight reconstruction, the backlight provided on a back surface of the hologram would not serve any purpose. The reflective layer 110 of Wenyon comprises a mirror, for example. Col. 7, lines 102. If a backlight were disposed on a back surface of such a mirrored layer, it would serve no purpose as the back light would either be blocked or reflected by the layer. One skilled in the art would not modify Wenyon to include a backlight on a back surface of the hologram for this additional reason.

Similarly, Applicant would note that one skilled in the art would not alter the arrangements of the LCD and hologram layer in Wenyon since placing the hologram layer with reflective layer 110 at a front surface of a display, would prevent any light from ever reaching the LCD layer. Therefore, the claims are not obvious over Wenyon and McCoy for this additional reason.

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Additionally, the Examiner states that McCoy teaches a self-luminous light used to back light a liquid crystal display in digital watches and other electronic instruments with visual displays (Col., lines 9-22). However, McCoy fails to teach or suggest a self-luminous light provided on the backside of a diffused reflective hologram, as set forth in Applicant's claims 11 and 25. Specifically, the backlight discussed in McCoy is attached to the backside of a liquid crystal display, not a hologram. (Col. 1, lines 64-68) Therefore, based on the above claims 11 and 25 should be found allowable.

With regard to the obviousness-type double patenting rejections over U.S.P. 6,384,883, the patentability of the claims is similar to those set forth above. Additionally, claims 35-37 are clearly not obvious in view of the cited claims.

Claims 35-38 have been added to describe the invention more particularly.

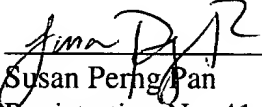
In view of the above, Applicant submits that claims 5, 6, 9-11, 23-25 and 31-38 are in condition for allowance. Therefore it is respectfully requested that the subject application be passed to issue at the earliest possible time. The Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860



Susan Perng Pan
Registration No. 41,239

WASHINGTON OFFICE



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PATENT TRADEMARK OFFICE

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 18-22 and 26-30 are canceled.

The claims are amended as follows:

5. (Amended) A liquid crystal display device using a hologram, characterized in that a liquid crystal display element is provided on a ~~back-surface~~ side thereof ~~opposite to a display surface side thereof~~ with a diffuse reflection type hologram itself capable of diffusing and reflecting light of selected wavelengths incident from a specific direction only in a direction defined as a viewing region, wherein said hologram has a different optical function with respect to different respective wavelengths.

Claims 37-38 are added as new claims.